(No Model.)

P. S. DODGE.

PRINTING PRESS.

No. 307,922. Patented Nov. 11, 1884.

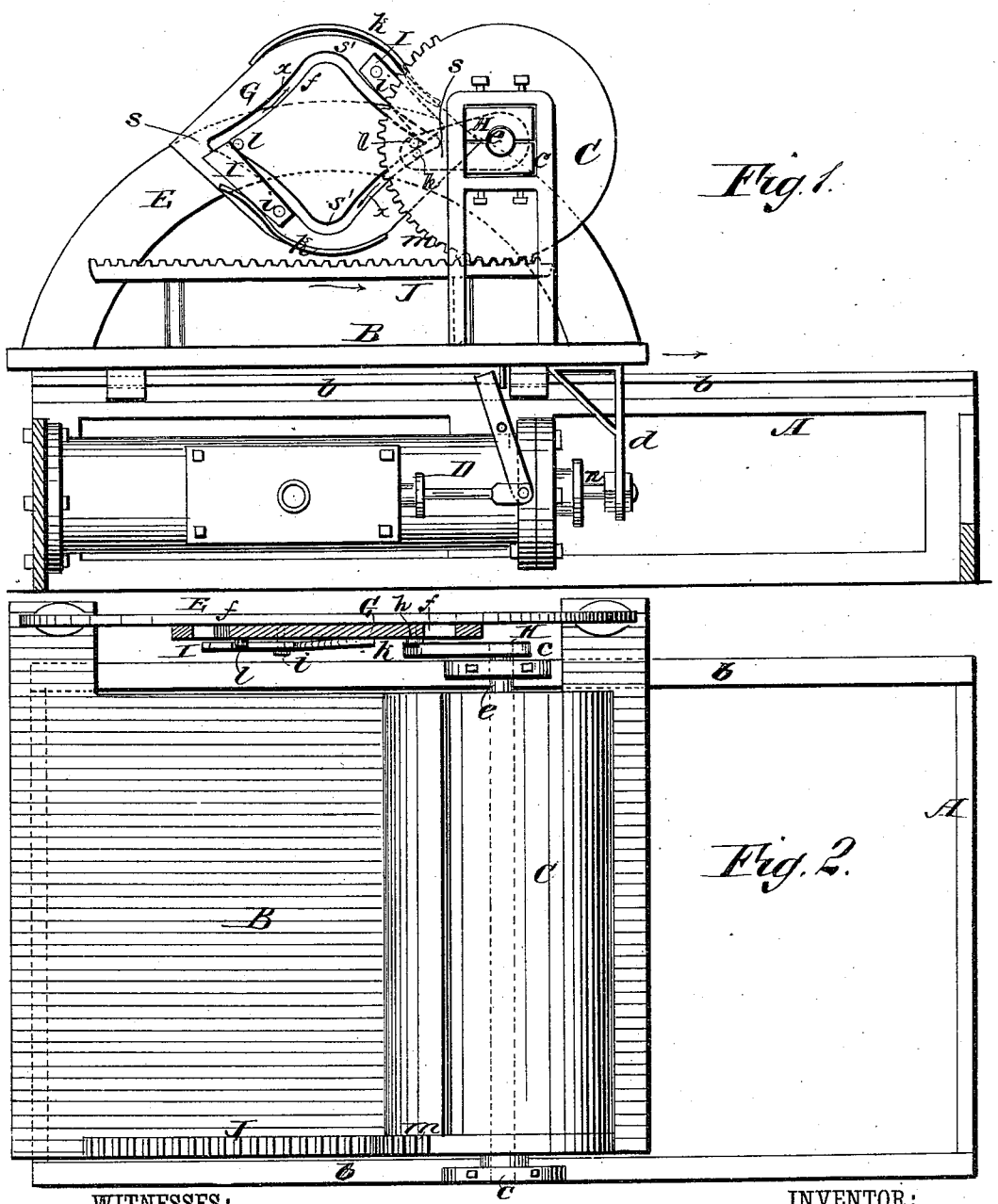


Fig. 1.

Fig. 2.

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PELEG S. DODGE, OF STANTON, MICHIGAN.

PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 307,922, dated November 11, 1884.

Application filed June 30, 1883. (No model.)

To all whom it may concern:

Be it known that I, PELEG S. DODGE, of Stanton, in the county of Montcalm and State of Michigan, have invented certain new and useful Improvements in Printing-Presses, of which the following is a full, clear, and exact description.

This invention relates to printing-presses in which a rectilinearly-reciprocating form-bed is used in connection with a rotating impression-cylinder.

The invention consists in the combination and arrangement of parts, as hereinafter fully described, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in both the figures.

Figure 1 represents a partly-sectional longitudinal elevation of such parts of a printing-press, with attached engine, as are necessary to illustrate my invention, and Fig. 2 a partly-sectional plan of the same.

A is the frame of the machine, having in its sides grooves or ways *b*, for the longitudinally-reciprocating bed B, on which the form is placed.

C is the impression-cylinder mounted over the bed B, and arranged to rotate within bearings in uprights *c c* on opposite sides of the frame.

D is the steam-cylinder of a direct-acting horizontal steam-engine, arranged within the frame A, at or near one end thereof, and in longitudinal direction with the frame and bed B, or it may be otherwise equivalently arranged below the bed. The piston of this engine has a stroke equal to one-half of the circumference of the impression-cylinder C, and the rod *n* of said piston is connected directly by an arm *d* with the form-bed B, which, working in the ways *b*, acts also as the cross-head of the engine, thus dispensing with a separate cross-head and all complicated mechanism to reciprocate the bed; also making the same ways or guides answer for both the piston cross-head of the engine and form-bed, and generally reducing friction, as well as applying the power more directly to the bed. Said engine may be fitted with any suitable valves, valve-motion, and governor; but as such form no part of this invention it is not deemed necessary here to show or describe them, nor yet those parts of the printing-press which have no bearing upon this invention—such as the inking apparatus, delivery-grippers, and other necessary devices—and which may be the same as those in common use. Over one-half, too, of the impression-cylinder may be of reduced diameter to permit return of the bed and type-forms.

The bearings of the shaft *e* of the impression-cylinder may be made adjustable up and down by upper and lower set-screws in the standards which carry said bearings.

E is an arched or other suitably-shaped upward support or frame-piece attached to one side of the bed B, and which may extend from opposite ends of the bed outside of the upright *c*. This support carries a fixed or vertically-adjustable grooved cam, G, which is arranged transversely to the axis of the cylinder C, outside of the end of its shaft.

Fitted fast on the end of the cylinder-shaft *e*, contiguous to said cam, is a crank, H, the wrist-pin *h* of which is arranged to travel within the groove *f* in the inner face of the cam. The shape of this groove will vary some according to the length of the crank; but it will consist, substantially, of four angling courses converging toward one another, and connecting with each other to form a continuous groove. These angling courses, which may be slightly arched inward in direction of their length, present sharp or only slightly-rounded inner marginal terminations, *s s*, on opposite sides of the cam, and the remaining or upper and lower angling portions, *s' s'*, of the groove may be of convex shape in an outward direction, or of sharp shape, if desired, all as shown in Fig. 1 of the drawings.

Pivoted, as at *i i*, to the grooved face of the cam in opposite relation with each other are wings or guides I I, closed by springs *k k* against stops *l l*, and arranged so that their free ends, when closed by the springs, form a continuation of the opposite inner walls of the groove and prevent a return of the crank-pin to the portion of the groove cut off, as shown in Fig. 1, and so that as the cam G is reciprocated, in connection with the bed B, the walls of the groove in the cam acting upon the wrist or crank pin *h* will operate to rotate the crank, the pin *h* traveling in the groove *f* in the di-

rection indicated by the arrows *x*, and pressing outward as they pass the wings or guides I I, which are returned to their normal position by the spring *k* as soon as the crank-pin has passed, so that as the motion of the cam G is reversed, together with the bed B, said guides will prevent the crank-pin from returning into the section of the groove from which it has passed, and will direct it to continue in the same forward continuous course, as indicated by the arrows *x*. In some cases the guides I I might be dispensed with. This grooved cam and crank movement is free from dead-center resistance and gives a more favorable angular action on the crank than does a crank and pitman motion, making the work easier, and by it the reciprocating rectilinear motion of the bed B is made to give a rotary motion to the cylinder C, and the circumference of said cylinder is made to move through the same amount of space in the same time as does the form-bed and the piston-head of the engine. For this purpose and to secure a proper action, while the shape of the grooved portion of the cam G may be more or less varied, its width vertically should be less than its length and equal to the diameter of the circle described by the crank-pin *h* and its opposite length, as shown here equal to about one and a quarter times the diameter of the circle described by the crank-pin, which will then have the full stroke or motion of the bed. As the crank is longer or shorter in proportion to the stroke of the form-bed, the vertical and longitudinal dimensions of the cam-groove will increase or diminish and its cycles become more or less curved and its angles sharper or more obtuse.

On the opposite end of the cylinder C to that which carries the crank is a toothed segment, *m*, extending a little less than one-half of the circumference of the cylinder, arranged to gear with a rack, J, on the bed. This rack and segment-gear might be dispensed with; but when used it aids and acts in unison with the cam G and crank H when the machine is laboring, equalizing strain on the different parts and assisting in effecting a perfect register.

The direct connection of the engine with the form-bed, as described, renders unnecessary coil-springs, air-cushions, and other devices to prevent jar or clash at the ends of the bed-stroke, at least such devices as usually employed may be dispensed with, if desired, as the valve of the engine may be so set that the cushioning of the piston by the steam in the cylinder will effect the desired result.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a printing-press, the combination, with a reciprocating bed, an impression-cylinder, and means, substantially as described, for reciprocating the bed, of a cam on said bed for communicating rotary motion to the cylinder during the reciprocating movement of the bed, as set forth.

2. The combination of a direct-acting piston-engine with the form-bed B, attached to the piston-rod of the engine and reciprocating in common with the engine-piston, the grooved cam G, attached to said bed for movement in concert with it, the impression-cylinder C, and the crank H, arranged to engage with the groove in the cam for operation of said cylinder by and in unison with the bed, essentially as shown and described.

3. The combination of the impression-cylinder C, provided with a toothed segment, *m*, the reciprocating bed B, having a rack, J, arranged to engage with said segment, the crank H, and the reciprocating grooved cam G, substantially as and for the purposes specified.

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